*AM33AK
RN
Aug 87

METEOROLOGICAL DATA PROCESSING GROUP OL-192/GMD-1

REFERENCE NOTE

US ARMY
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*Supersedes RN AM33AK, Aug 85.

INTRODUCTION

The purpose of the METEOROLOGICAL DATA PROCESSING GROUP OL-192/GMD-1 is to convert raw met data into accurate real time met messages. Even though most of the computations are automatic, the computer operator retains full control of the OL-192. He must enter the raw met data from the RADIOSONDE RECORDER AN/TMQ-5, and the raw wind data from the control-recorder when prompted by the LED display of the OL-192. Learning this procedure is the first step in becoming qualified to operate the OL-192. This procedure will be covered in Section I. In Section II you will be trained to enter raw met and wind data into the computer to produce the various met messages.

Section I. COMPONENTS AND ASSEMBLY

1. The OL-192 is designed to improve the operational capabilities do the technically obsolete RAWINSONDE SYSTEM by providing more timely met data which, in turn, increases the accuracy of artillery fire. The OL-192 is designed for operation within a mobile ground shelter or for transportation in airborne/air dropped open bed vehicles.

2. The OL-192 (fig 1) consists of a desk top mini computer, a paper tape reader/perforator and associated components. The computer, HP 9825A (fig 2), is a programmable desk top computer weighing 26 pounds which, when programed with a met program, will convert the raw met and wind data into usable met messages. It can be operated on any of four line voltages; 100, 120, 220, or 240 volts AC, with a line frequency from 48 to 66 Hertz. The tape reader/perforator (fig. 3) weighs 46 1/2 pounds and operates on 115, 220, or 240 volts AC with a line frequency from 47 to 64 Hertz.

3. The computer has a 32 character LED (light emitting diodes) display; a 16 character thermal printer which prints a hard copy tape listing of programs, entries, messages, and processed data on heat sensitive paper; a magnetic tape data cartridge reader which is used for fast loading and access of programs and /or data. The computer also has an audio alarm which prompts the operator to input data.

4. The most noticeable parts of the computer are the three keyboards. You, as operators, will be concerned primarily with the numeric keyboard and the special function keyboard. The computer is provided with a protective cover which encloses the alphanumeric keyboard and the special programming keys. This is to prevent the operator from accidentally using the wrong keys and destroying the met program when entering the raw met and wind data. Although the alphanumeric keyboard is covered, there are some instances when you will be required to use it. This procedure will be discussed later.

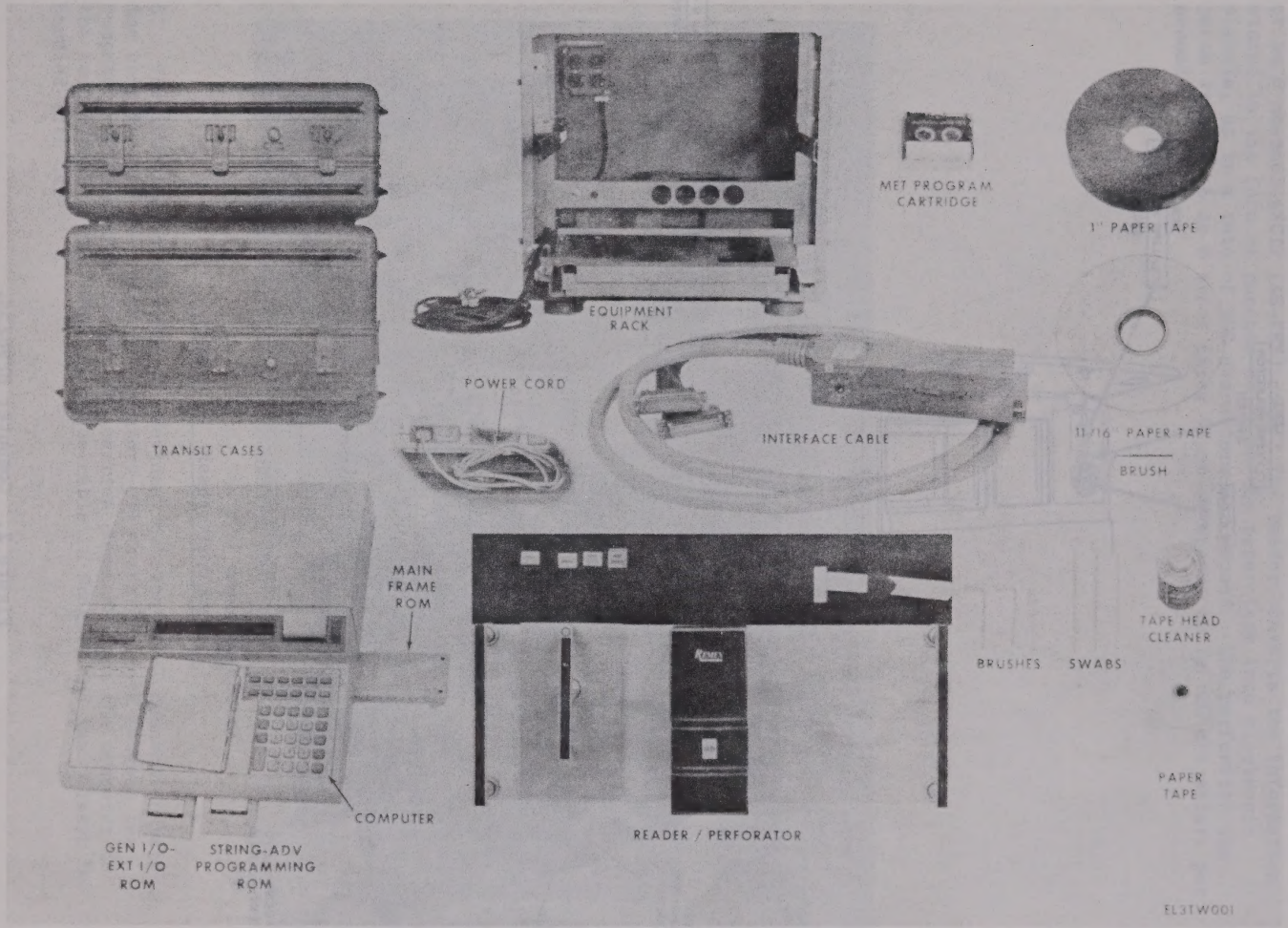

Figure 1. Meteorological Data Processing Group OL-192 (Major Components).

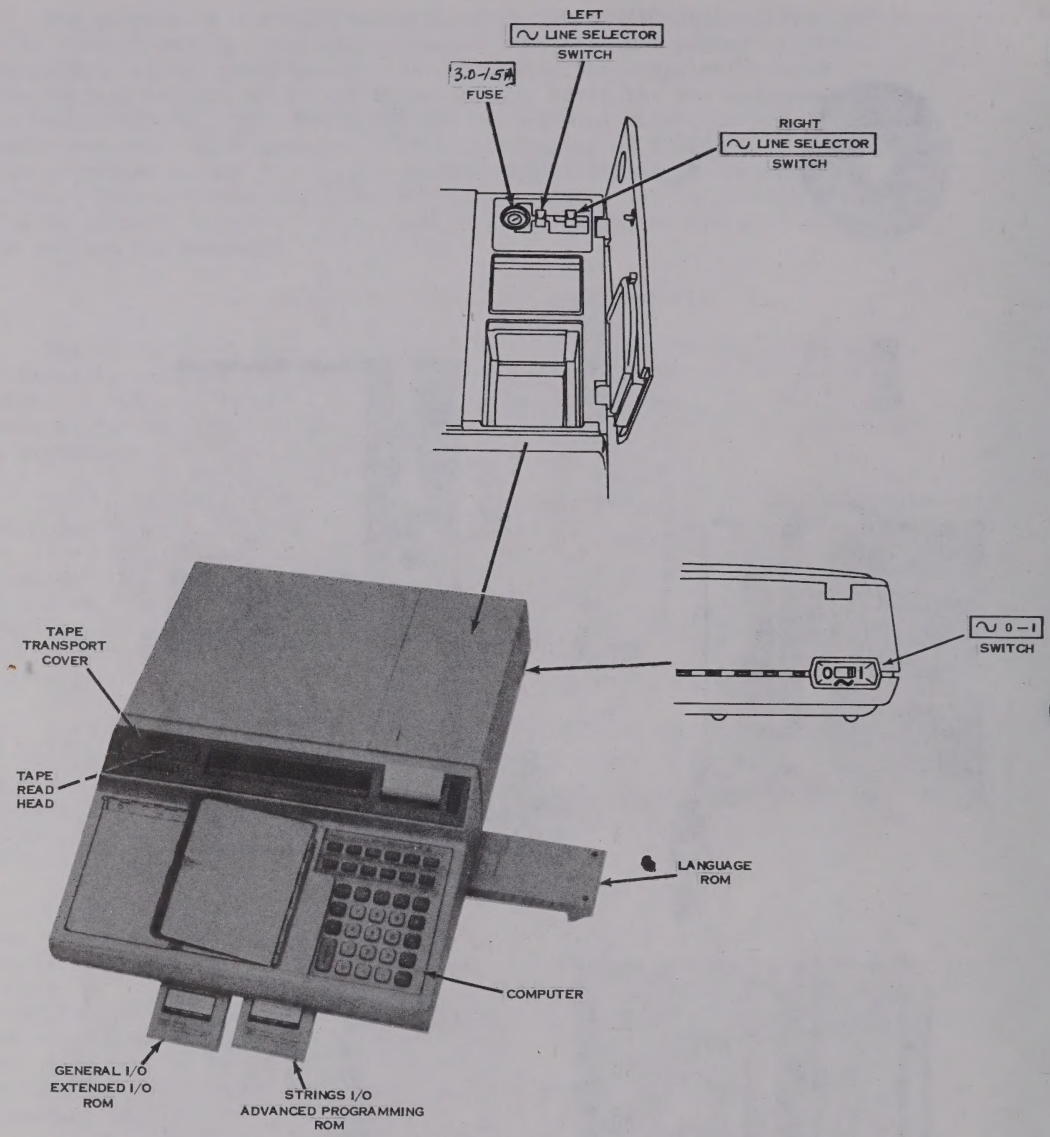

Figure 2. Computer HP9825A.

5. The reader/perforator can read and/or perforate a 5 channel baudot code or an 8 channel ASCII (AS-KEY) code. The reader converts the information stored in the form of punched holes on the paper tape into electronic signals, up to a rate of 300 characters per second. The perforator can punch standard 6 or 8 track paper tapes at speeds up to 120 characters per second.

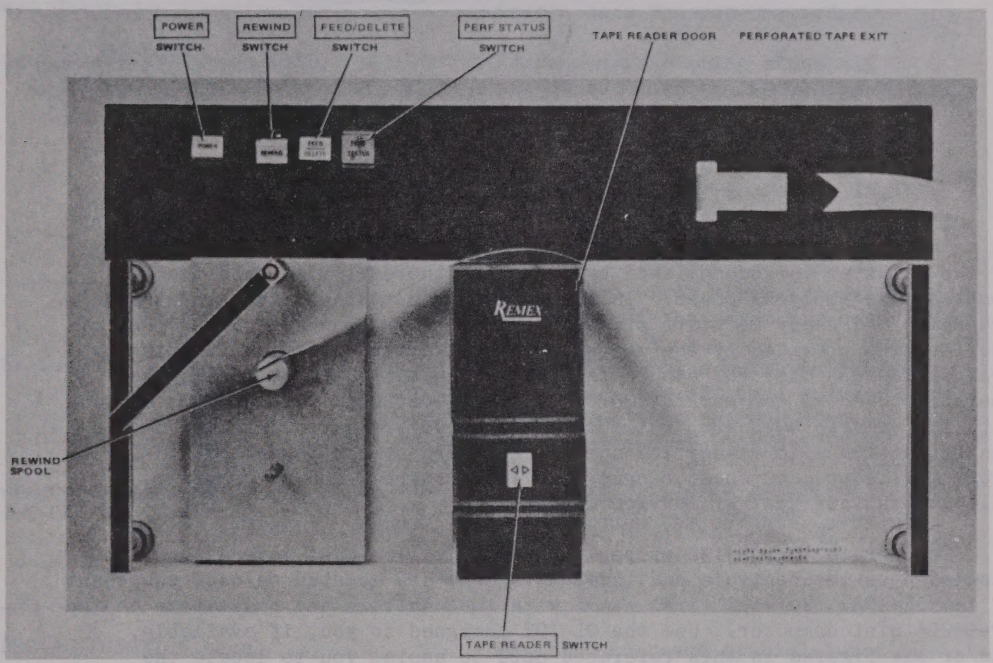

Figure 3. Reader/Perforator.

6. The interface cable (fig 4) provides the electrical connection between the computer and the reader/perforator. It transfers data between the computer and reader/perforator and carries commands from the computer to the reader/perforator. The interface cable is fragile and must always be handled with care.

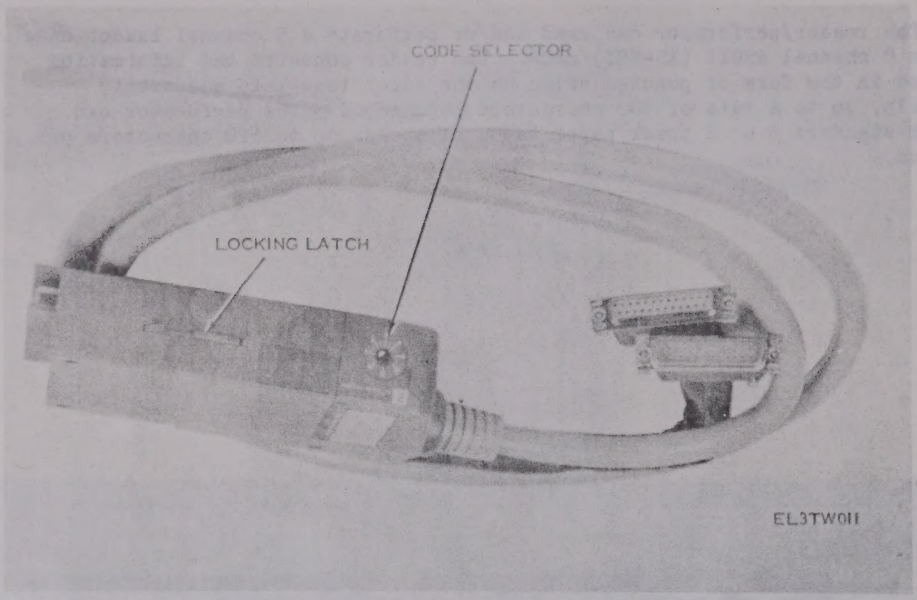

Figure 4. Interface Cable

7. The software consists of the Met Program Data Cartridge (fig 1) which is nothing more than a small version of a cassette tape. The programming of the computer is accomplished by inserting the cartridge into the computer and applying power. In approximately 6 seconds, the computer is programed and ready to start processing the raw met and wind data. One of the features provided by the met program software is that the LED display prompts the operator for each data entry. The audio alarm signals the operator to enter new met data or to answer questions. Met data is entered with the numeric keyboard, while the radiosonde pressure calibration data can be entered with either the numeric keyboard or the tape reader. The program will produce sound ranging, ballistic type 2 and 3, computer, fallout, and air weather service messages.

8. To operate the OL-192 properly and safely, you must have a thorough knowledge of the controls and indicators that are located on each component of the OL-192. We will first start with the controls and indicators on the HP-9825A mini computer. Use the OL-192 assigned to you, if available, and/or the figures in this reference note to assist you to locate the various controls and indicators as you read about them.

9. Computer HP9825A (fig 2)

Control or Indicator	Function
O-1 switch (ON/OFF)	In 1 position power is supplied to computer. In O position, power is removed from computer.

3.0-1.5A fuse
(Located under paper bin cover.)

For 100 VAC or 120 VAC operation, 3 amp fuse is used.

LINE SELECTOR (Left and Right) switches (located under paper bin cover).

Two (2) position switches used to match computer input voltages as follows:

Voltage (VAC)	Left Switch	Right Switch
100	UP	UP
120	UP	DOWN
220	DOWN	UP
240	DOWN	DOWN

Tape Program Running Light

Glows to indicate tape is running, searching, loading a program, or recording data.

Tape Cartridge Ejection Bar

Ejects Data Program Cartridge.

Light Emitting Diodes (LED) display

Alphanumeric display shows all programed operator instructions.
Displays all entered data for OL-192 operator's verification prior to printing and storage.
Displays red busy indicator light to show that processor is busy and will not accept data.
Displays error messages that are defined in error message booklet stored under the paper bin cover.

The Lazy "T"

This ⊢ symbol appears as the left most character of the display indicating that the computer is ready and awaiting inputs.

Paper advance wheel

Manual advance heat sensitive paper tape through the computer's thermal printer.

SPECIAL FUNCTION keys

Metallic engraved special function matrix identifies each key.

f_0

START - Starts met data processing by loading computer from the met program data cartridge.

f_1

CONT - Continues met processing after interruptions for corrections, deletions or message outputs.

f_2	LAST FLT - Recalls last flight from met data program cartridge storage. Key is programed as an operator's check of OL-192.
f_3	TACFIRE - Will be programed to communicate with TACFIRE weapons systems automatically.
f_4	P. TAPE - Programed to prompt operator through procedures to punch radiosonde pressure calibration tapes. Punched tape is automatically output.
f_5	PIBAL - Reserved for pibal programs.
f_6	INFO - Activates after operator presses the NO key. When pressed, computer prints processed met data beginning with the last significant data level down to surface, pauses, then outputs processed wind data from surface up to the height of the last significant met data level; then continues as if processing had not been interrupted.
f_7	OUTPUT - Activates after operator presses the NO key. When pressed, computer outputs a copy of all or any met message(s) desired.
f_8	DELETE - Activates after operator presses the NO key. Deletes punching or printing of unwanted met messages. Repeating NO-DELETE allows back stepping to correct errors or to pick up omitted data for processing.
f_9	NO - When pressed, caused automatic repeat of prompting to correct errors. Activates the INFO, OUTPUT, and DELETE keys. Also used as STOP processing key.
f_{10}	YES - Used as a verifier key. When pressed, entered data is transferred from holding registers into memory for storage until required for processing and/or

	output. Questions that require verification will display a question mark (?).
f_{11}	DATA IN - When pressed, causes printer to print entered data, clears LED for next prompt and puts all data entries into holding registers until data is verified and placed in storage by the YES key.
Audible beeps	Are alerts to instructions that direct you to enter data specified by the LED display or perform actions as explained below: One (1) beep indicates that the LED display is a question to be answered using the YES or NO key. Two (2) beeps indicate that the LED is displaying a data entry or input request. Three (3) beeps indicate that performance type instructions are being displayed; i.e., load pressure tape, turn on Remex, etc.
Numeric and symbol keys	Standard computer functions as labeled with the exception of the * key, which has three functions: 1. As a multiplier key. 2. Used to indicate MISSING MET DATA LEVEL when used with reference ordinate values. 3. Used to indicate MISSING WIND DATA when used with elevation angle and causes computer to interpolate angular data after radiosonde has ascended at least 1,000 meters.
Alfa keys	Typical typewriter keyboard; prints as labeled. This keyboard is used when the operator types in a coded location requiring letters (normally capital letters).

10. READER/PERFORATOR (Figure 3)

Control or Indicator	Function
POWER switch and indicator	Supplies power to both tape reader and perforator. Push up, lamp

	illuminates, indicating power on, push down, lamp goes out and power is off.
REWIND switch	Operates tape rewind motor, is spring loaded off. Motor operates only while switch is pressed.
FEED/DELETE switch	3-way switch, spring loaded to center (or off) position. Pressing upper part (FEED) causes unpunched tape to feed out. Pressing lower par (DELETE) causes perforator to punch all channels.
PERF STATUS indicator	Illuminates when paper tape supply is low. Does not affect perforator's functioning.
Tape reader door	Door open, off condition for computer commands. Door closed, ready condition, awaiting computer commands. Tapes are read when computer YES key is pressed after LED prompt IS READER DOOR CLOSED?
Tape reader switch	Normal position is spring loaded to center (or off) position. Left side pressed, causes reader motor to drive tape left. Right side pressed, causes reader motor to drive tape right.

11. INTERFACE cable (Figure 4)

Control or Indicator	Function
Code selector	For OL-192 operation, MUST be positioned on 2.
Locking latch	Locks interface cable to computer.

12. ERROR MESSAGES: When a procedural or equipment error is detected by the computer, an error message is displayed on the LED. Following is a list of correctable error messages. These error messages and corrections apply only to electronic soundings. Error messages during visual soundings have no corrections other then turning the computer off and beginning again.

ERROR MESSAGES	CORRECTIONS
a. ERROR 07	Operator procedural error. Wrong special function key used. Press DATA-IN to clear error.

ERROR MESSAGES	CORRECTIONS
b. ERROR 09	Same as error 07.
c. ERROR 64	Operator procedural error. Attempt was made to enter data when the computer is not ready to accept data, (red light glowing). Re-start flight.
d. ERROR G-8	Perforator/reader out of tape. Replace tape. Press CONT.
e. ERROR 15	Computer printer out of paper. Replace. Press CONT.
f. ERROR 30	Tape cartridge not inserted properly. Check transporter slot and cartridge. Replace tape. Press CONT.
g. ERROR 42	Tape record tab not in record position. Remove tape. Correct and replace tape. Press CONT.
h. ERROR 44 OR 46	Tape problem. Read head dirty, or trash in tape transporter slot. Something is preventing the tape reader from reading the Met Program, correct malfunction. Press CONT.
i. ERROR E4 in 322	Error in track E4 file 322. Remex not accepting command from computer to read calibration tape. (1) Check calibration tape a. Wrong end of tape. b. Tape not seated on sprocket. (2) Correct malfunction, then type CONT on the alphanumeric keyboard, and 322 on the numeric keyboard. Display will read CONT 322. Press EXECUTE.

13. Assembling the OL-192 in the classroom is a very simple procedure which involves connecting the interface cable to the computer and reader/perforator and connecting the power cables of the computer and

reader/perforator to an electrical outlet. The OL-192/GMD-1 in the met section to which you will be assigned may be mounted differently. You will have to refer to TM 11-6660-263-10 for the proper installation procedures.

Section II. FIGHT COMPUTATION

14. The OL-192 is programed to cause the light-emitting diodes (LED), to display visual operator input and output instructions. The program also causes the computer to beep audible instructions. These instructions lead you, the operator, through the procedures required to reduce raw met data to processed met data. To better understand the operations of the OL-192, you must have a thorough knowledge of the input and output instructions displayed by the LED display.

15. A brief explanation of the LED display follows:

a. The "lazy T" means that the computer is waiting for inputs from you.

b. The glowing red dot with the lazy T indicates that the program is loading the computer memories; therefore, no data can be entered. If the tape program is running, or processing, the glowing orange dot to the left of the cartridge eject button indicates that the program tape is winding or rewinding. After about 9 seconds, both glowing indicators go out and the computer printer begins to print the program title and date as the LED display begins prompting for data inputs.

c. Questions that require a verification response with the YES key or NO key display a question mark (?).

d. Entry response formats are displayed within brackets, indicating the number of digits required, the location of decimal points or hyphens, and the numerical limits of the response entry.

Entry response example: ENTER YEAR (1900 to 1999).

e. Action response formats are displayed as statements.

Action response example: LAUNCH FLIGHT.

f. Examine the response keys located on the special function keyboard and the numeric keyboard. They consist of the CLEAR, DATA IN, YES and NO keys. You must know the purpose of these keys and when to use them. Operational responses are keyed in as instructed by the LED display. The displays are then put into the holding registers by pressing the DATA IN key, which also cycles the LED display to the next instruction. If you notice that the date is incorrect before pressing the DATA IN key, you can press the CLEAR key and key in the correct data. At periodic programed phases, the computer printer automatically prints a copy of this data and the LED display will request verification of the data printed for that phase. The YES key verifies the data is correct; if the data is not correct, press the NO key and the program will repeat all requests for that phase.

16. In conjunction with the instructions displayed by the LED display are the audible prompting (beeps). Audible beeps that direct you to key in data specified by the LED display or perform actions are explained below:

a. One beep indicates that the LED display is a question to be answered by using the YES or NO key. The YES key is pressed to verify and enter the displayed data into memory. The NO key is pressed, when necessary, to correct a printed error, or to select a choice other than what is displayed.

b. Two beeps indicate that the LED display is a data input request. You respond by using an alphanumeric, numeric, or a special function key. Your response is displayed before it is entered. You should read each display and, if an error is observed, press the CLEAR key and rekey in the data. If the displayed data is correct, press the DATA IN key. Pressing the DATA IN key enters your displayed response into the holding registers and clears the LED display so that the next instruction can be displayed.

c. Three beeps indicate that performance-type instructions are being displayed by the LED display. Typical actions are to turn designated switches ON or OFF, load pressure tape, change paper tape, or calibrate the Q-5 recorder.

17. As mentioned in paragraph 14, you must have a thorough knowledge of the input and output instructions displayed by the LED. If you encountered any difficulties understanding paragraphs 14, 15 and 16 , it will be to your benefit to reread the paragraphs. If you think of the OL-192 as a machine that is talking to you by way of its LED display, and that you are answering it by use of the special function keys and the numeric keyboard, you should have no problem computing met messages.

18. When you remove the MET DATA PROGRAM CARTRIDGE from its plastic case and look at the front side of it, you will notice that in the lower right hand corner there is a small plastic slide, the word RECORD, and a small arrow. The slide must ALWAYS be to the far right position for both PIBAL and electronic flights (fig 5).

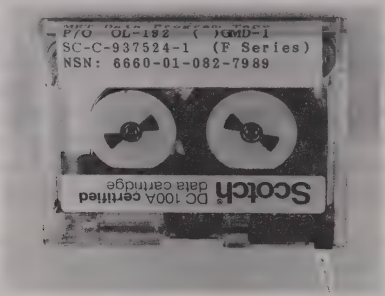

Figure 5. Met Data Program Cartridge

19. To install the cartridge in the computer properly, the back side (metal) of the cartridge must be facing you. Place the cartridge over the door of the cartridge slot and insert the cartridge. Notice that the cartridge eject button raises from its slot. To eject the cartridge just push the eject button in (down). Insert the cartridge. Once it is inserted properly, place the power on/off switch to the ON position to begin.

Section III. PIBAL PROCEDURES

20. If you have a computer, follow along and do the steps as indicated. Use the data from visual flight #1 at the back of this booklet. Remove the PIBAL tape from the case, insert it into the computer, and place the power on/off switch to the ON position. You will notice that the LED display USE FUNCTIONAL KEYS TO ACTIVATE is preceded by a glowing red light. Remember, anytime this red light is glowing, you are not to enter any data into the computer by using the numeric or special function keys.

21. When the glowing rd light goes out, press the PIBAL key. The LED will display "PROCESSING PIBAL." Then it will display "ENTER YEAR (1900-1999)". Enter the year the flight was released. The LED will then request the month, date, and time (GMT) separately.

Note. All data is keyed in using the numeric or alpha keys as indicated, but it is NOT loaded into the computer until the DATA IN key is pressed. Remember to check the data on the LED display before you press the DATA IN key. If you make a mistake, press the clear key and key in the correct data, check it, and then enter it into the computer with the DATA IN key. Key in each item using the numeric keys, check the data, and enter it into the computer with the DATA IN key. After the last entry, the LED will display "IS THE DAT 28 1500Z JUN 85?"

This requires a yes or no response. If the data is incorrect press NO and the computer will ask you for the data and time again.

22. The LED will display "TIME DATA DISPLAY" and then display "ENTER LOCAL TIME (0001 to 2400)". Key in the local standard time at the start of the flight and, if correct when displayed, enter it. A request for verification is displayed on the LED which requires a yes or no response.

23. The LED will display "ENTER SUNRISE TIME (0001 to 2400)". After determining the sunrise time (local standard) key in the time and enter it. A request for verification is displayed on the LED which requires a yes or not response.

24. The LED will display "ENTER SUNSET TIME (0001 to 2400)". Key in the sunset time (local standard) and enter it. A request for verification is displayed on the LED.

25. The LED will display "RAIN, DRIZZLE or FOG?". If any of the above is occurring, press the YES key. Press the NO key if any of these conditions are not present.

a. A YES key response causes the LED to display "ENTER WEATHER CONDITION". Using the alphanumeric keyboard spell out and enter the appropriate condition--(either RAIN, DRIZZLE or FOG). The LED will display "IS SKY HALF TO TOTAL OVERCAST?". A yes or no response is required. If the yes key is pressed, the computer will print the weather condition and "OVERCAST".

b. If the sky is less than half overcast, then the NO key is pressed and the computer will print the weather condition and "CLEAR SKY".

c. A NO key response to the RAIN, DRIZZLE or FOG display causes the LED to display "IS SKY HALF TO TOTAL OVERCAST?". Remember, the sky can be overcast without precipation. A YES or NO response is required. If the YES key is pressed, the computer will print "OVERCAST". If the NO key is pressed the computer will print "CLEAR SKY".

26. The LED will display "PERFORM SURVEY CONTROL", then it will prompt you through the procedures of entering the survey or location data.

a. The LED will display "ENTER STATION ELEVATION (METER)". The station elevation is entered to the nearest meter.*

*Note. Height is in tens of meters on DA 4524.

b. The LED will display "ENTER LATITUDE (00 to 90.0)". Enter station latitude to the nearest tenth of a degree.

c. The LED displays "ENTER LONGITUDE (0.0 to 99.9)". Key in the station longitude to the nearest tenth of a degree.

d. The LED displays "ENTER OCTANT (0 to 8, not 4)". Determine station octant and key in the octant number by using the numeric key and

enter it. This time, the computer will print the survey control data, and the LED will display "IS SURVEY DATA CORRECT?". A YES or NO response is required.

e. If the NO key is pressed, the computer will require you to perform another Survey Control.

f. If the YES key is pressed, indicating that the Survey Control data was entered correctly, the computer will then print "SFC WIND VALUES AT TIME "0"".

27. SFC WIND VALUES AT TIME "0" tells you that all data for Survey Control or location data has been entered into the computer and that the computer is now ready to accept the surface weather data. Just prior to, and during balloon release, you, as the OL-192 operator, will control the data collection process, and enter the data on the wind computation form, DA Form 4469. The accuracy of all data must be checked prior to entry into the computer. Just before the balloon is released, the theodolite operator will read the azimuth to the offset point to the nearest whole degree. Enter this direction on the surface line under column 6 (Azimuth Angle). While at the offset point, measure the surface wind direction and speed with the hand held anemometer and enter the data under columns 10 and 11 on the surface line of the wind computations form. As soon as the balloon is released, turn and walk to the theodolite counting the paces until you reach the theodolite. Convert this distance to meters and enter it on the surface line under column 7 (Horizontal Distance). As the theodolite operator tracks the balloon you will record the angles under columns 5 and 6.

28. The LED will prompt you through all of the entries for surface wind data as follows:

a. The LED will display "ENTER AZIMUTH OFFSET AT LAUNCH". Look at the wind computation form on the surface line under column 6, (Horizontal distance). Key in the azimuth angle with the numeric keyboard and enter it.

b. The LED will display "ENTER HORIZONTAL DISTANCE OFFSET". Key in that distance from column 7 of the form using the numeric keys and enter it.

c. The LED will display "ENTER SFC WIND DIRECTION". Key in the surface wind direction from column 10 using the numeric keys.

d. The LED will display "ENTER SFC WIND SPEED". The surface wind speed is on the surface line under column 11. Key in the surface wind speed.

e. All surface wind data is now entered into the computer. The LED displays "ARE PRINTED SFC WIND VALUES OK?". This question requires a YES or NO answer. A NO answer (using the NO key) causes the LED to display "ENTER AZIMUTH OFFSET AT LAUNCH" again, then all surface wind data must be reentered. A YES answer will cause the LED to display "ENTER SURFACE PRESSURE AT LAUNCH".

29. The next series of entries are the surface temperature and pressure data.

a. The LED will display "ENTER SURFACE PRESS AT LAUNCH". Key in the pressure to the nearest 0.1 millibar.

b. The LED will display "ENTER SFC TEMPERATURE (deg C)". Key in the dry bulb temperature to the nearest 0.1 degree.

c. The LED will display "ENTER WET BULB TEMP (deg C)". Key in the wet bulb temperature to the nearest 0.1 degree.

d. The LED will display "ARE SFC VALUES OK?". You should verify the printed values for surface pressure and temperatures. If the data is incorrect press the NO key and repeat the pressure and temperature steps. If the data is correct press the YES key and the computer will print the humidity and virtual temperature values.

e. The LED will display "ENTER MEAN SURFACE DENSITY". Key in the mean surface density to the nearest 0.1 g/m^3. The computer will print the surface density and the mean surface density.

f. The LED will display "ENTER BALLOON WEIGHT (gms)". Key in the balloon weight in grams (30 or 100). The LED will display "IS BALLOON WEIGHT OK?". A YES or NO answer is required. A NO answer will cause the computer to display "ENTER BALLOON WEIGHT (gms)" again. A YES answer will cause the LED to display "WAS HELIUM USED FOR INFLATION?". This display only requires a YES or NO answer. If hydrogen was used press NO. If helium was used press YES. The computer will then print the type of gas used to inflate the balloon.

30. After the type of gas is printed the LED will display "ENTER OBSERVATION TIME". With this display you have completed the surface data and are ready to enter the upper air data. The observation times are the times at the top of each zone which are printed onthe wind computation form in column 1. Before these times can be entered into the OL-192 they must be converted from minutes and seconds to minutes and tenths of a minute. This is done prior to release of the balloon and entered in column 4 of the wind computation form. You must ensure that the time column selected matches the balloon size used for the flight.

a. Key in the observation time from column 4.

b. The LED will display "ENTER ELEVATION ANGLE AT TIME XX". Column 5 contains the elevation angle for each top of zone time. Key in the elevation angle and enter it.

c. The LED will display "ENTER AZ ANGLE AT TIME XX". The azimuth angles are in column 6. Key in the azimuth angle.

d. The LED will display "ARE PRINTED DATA OK?". This requires a YES or NO response. If an angle is incorrect, press NO and the computer will request the data to be re-entered. If the angles are correct, press YES and the LED will display "ENTER OBSERVATION TIME". As the computer

operator, you will continue to enter data at the top of each zone until the end of the requirement, a low ceiling, or balloon burst, causes termination of the flight. In order to let the computer know when the end of the requirement or termination is reached, press the asterisk (*) key and the DATA IN key, in that order, when "ENTER OBSERVATION TIME" is displayed.

31. The LED will display "DO YOU WANT ZONE INFORMATION?". This display requires a YES or NO response. The zone information gives detailed data about each zone. In most cases a NO anwser will be given.

32. The LED will display "ENTER REGION NUMBER". There are seven climatic region in the northern hemisphere as shown on the map at page 1-2 of FM 6-16-2.

a. Key in the Region and enter it with the DATA IN key.

b. The LED will display "ENTER MESSAGE TYPE". Key in a 2 for a ballistic type 2 message or a 3 for a ballistic type 3 message.

c. The LED will display "ENTER PERIOD". The period of the day, (night, afternoon, or transition) is spelled out using the alpha keys. Type in the period and enter it with the DATA IN key. The computer will print DEPARTURE X.X and the numerical values of departure from mean surface density for 15 lines.

33. The LED will display "TURN ON REMEX". The computer will print PIBAL FLIGHT, and the date/time group of the flight, then automatically go into message output and print the sound ranging message and ballistic type 2 or 3 message. When the computer completes the printout of the messages the LED will display "USE FUNCTIONAL KEYS TO ACTIVATE". This completes the processing of the data for the PIBAL flight. Eject the tape and turn the computer off. PIBAL flights #2 and #3 may be used for more practice in the operation of the OL-192 computer.

Section IV. ELECTRONIC PROCEDURES

34. When using the OL-192 to compute electronic met messages, you will need the radiosonde data sheet which contains the heading data for the message and the uncorrected data from the Q-5 chart. You also need the pressure calibration chart and/or tape, the control recorder tape, the linearity calibration chart, and the additional data printed on the bottom of the form. At the end of this RN there are three radiosonde data sheets numbered 1, 2, & 3. There is also a radiosonde calibration chart, a control recorder tape and a linearity calibration chart. These last items can be used for all three exercises. We will use the first sounding to explain each step.

35. Insert the electronic sounding tape and turn on the computer as you did in the pibal portion. The computer will print the type of tape used and the LED will display "USE FUNCTIONAL KEYS TO ACTIVATE". This time press the START key. The LED will display "PROCESSING START OF FLIGHT", and then display "ENTER YEAR (1900 to 1999)". If you have forgotten the purpose of the various keys, re-read the paragraph on CONTROLS AND INDICATORS.

36. The computer is asking for the year the flight was worked. Look at the preflight time box, the GMT date and time is 17 May 1984 at 1420 hrs.

a. Key in 1984 and enter with the DATA IN key. All data has to be entered using the DATA IN key. I will not tell you each time to use the DATA IN key.

b. The LED now displays "ENTER NUMBER OF MONTH (1 to 12)". Key in 05 for the month of May.

c. The LED will display "ENTER DAY OF MONTH (1 to 31)". Key in 17.

d. The LED will display "ENTER ZULU TIME (0000 to 2359)". GMT and Zulu times are the same, so key in 1420.

e. All data for the date time group is now in the computer. The LED will display "IS THE DATE 17 1420Z May 84?". Compare the data on the radiosonde data sheet with the LED display. If the display is incorrect key NO and the LED will display "ENTER YEAR (1900 TO 1999)" and all data can be re-entered. If the display is correct key YES and the LED will display "17 1420Z May 84". The computer will print the date time group and the LED will display "IS SURVEY OF 04 1713Z Dec 84 OK?".

37. The survey data is the location of the met section which includes the octant, longitude, latitude, and height above mean sea level in meters. This display requires a YES or NO response. A NO response will cause the computer to request all the survey data to be re-entered. As a rule, this data needs to be re-entered only if the section has moved recently. The YES response causes the computer to print the survey data already in the computer. Press the NO key.

a. The LED will display "PERFORM SURVEY CONTROL", then will display "ENTER STATION ELEVATION (METERS)". The survey data is added to the bottom of the radiosonde data sheet. Key in 360. The LED will display "IS THE STATION ELEV 360 METERS?". This requires a YES or NO entry. A NO entry will cause the LED to display "ENTER STATION ELEVATION (METERS)". Press NO and re-enter 360. A YES entry will cause the LED to display "IS THIS A CODED LOCATION?".

b. A coded location requires a code for your location instead of actual longitude and latitude values. Press the NO key. The LED will display "ENTER LATITUDE (0.0 to 90.0)". Key in 34.7. The LED will display "IS THE LATITUDE 34.7 DEGREES?". A YES or NO response is required. A NO response will require the latitude to be re-entered. Key in YES if the data is correct. A YES entry will cause the LED to display "ENTER LONGITUDE (0.0 to 99.9)". Key in 98.3 and the LED will display "IS THE LONGITUDE 98.3 DEGREES?". Again, a YES or NO response is necessary. Key in YES if the data is correct, NO if incorrect and re-enter the longitude.

c. The LED will display "ENTER OCTANT (0 to 8 not 4)". Key in 1; our location is in the first octant. The LED will display "IS OCTANT 1?". A YES or NO response is required. Notice that the computer wants you to be very sure that the data you are entering is correct. Press the YES key. The LED will display "SURVEY DATA" and the computer will print the data.

d. Once the survey data is entered, the LED displays "IS A TTY-76 TELETAPE NEEDED?". A YES key response causes the reader/perforator to punch a tape acceptable to the current RATT rig and FADAC mechanical tape readers. A NO key response causes the reader/perforator to punch a tape acceptable for the UGC-74, a future high-speed data transmission system. Both the YES and NO response cause the LED display to remind you to check the size of the paper tape protruding from the punch. For the flights in this exercise, answer using the YES key.

38. The LED will then display "IS RCD CK OF 04 2121Z Mar 85 OK?". The date time group here (04 2121Z Mar 85) will be the last time your radiosonde recorder calibration was checked, so any date time group may be displayed. The linearity calibration is a check made by the unit equipment mechanic to determine exactly where the pen prints at 11 known frequencies. If a tolerance of 0.3 recorder divisions is exceeded the Q5 must be re-aligned. These exact recorder divisions must be entered into the computer each time the linearity calibration is performed. A YES entry will cause the computer to print the linearity calibration data. For this exercise let's assume that the equipment mechanic has just completed the linearity calibration and has drawn a linearity calibration chart on the portion of the Q5 chart on page 38 . Press the NO key.

a. The LED will display "PERFORM LINEARITY CALIBRATION CHECK". Then it will display "ENTER RCD SERIAL NUMBER (XXXXXX)". The serial number of our Q5 (recorder) is 000003. All six digits must be entered. Key in 000003. The LED will display "IS SERIAL NUMBER 000003?". A YES or NO response is required. If the serial number is correct key in YES, if not, key in NO and re-enter the serial number. When YES is entered the LED will display "ENTER RCD ORDINATE AT 190 HERTZ". The Q5's pen will print at exactly one half of the input signal so the ordinate (recorder division) at 190 Hz should be 95.0. Our linearity calibration chart shows 95.0. Key in 95.0. The LED will display "ENTER RCD ORDINATE AT 180 HERTZ". Key in 90.0. The eleven numbers (plus zero) directly under the recorder division numbers on the Q5 chart are the linearity calibration recorder divisions. Remember, each display is double the recorder division that must be entered. A 120 display requires that you enter 60 recorder divisions. For the 100 display, you will enter 49.9, for 80, 39.9 for 60, 30.0 and for 40, 19.9. After all the recorder divisions, including 0.0, have been entered, the LED will display "AN/TMQ-5 RECORDER LINEARITY DATA". At this time if one or more of the entries are out of tolerance (more than .3 of a recorder division) or if you made a mistake and pressed the wrong key, the LED will display "REPAIR RECORDER, THEN TRY AGAIN", and the computer will print 'OUT OF TOLERANCE VALUES INDICATED BY AN (*)", "OUT OF TOLERANCE VALUES MAY BE EITHER (+) OR (-)". Then "RECALIBRATE RCD". The LED will display "ENTER RCD ORDINATE AT 190 HERTZ".

39. Once the linearity calibration is entered, the LED will display "AN/TMQ-5 RECORDER LINEARITY DATA" and the computer will print the linearity calibration data, then the LED will display "IS AN/AMT-4 SONDE BEING USED?". This display requires a YES or NO response. A YES respnse will cause the computer to print "RADIOSONDE TYPE: ARMY AN/AMT-4". A NO response causes the LED to display "USING NWS RADIOSONDE JO31 SERIES". Here, at the school, only the J031 radiosonde is used, so press the NO key. The NO response causes the computer to print "RADIOSONDE TYPE: NWS J031 SERIES".

40. The LED then displays "DO YOU HAVE A PRESSURE TAPE?". This pressure tape is a punched tape of the data printed on the pressure calibration chart. In the near future, all radiosondes will have a pressure calibration tape issued with them, which can then be entered into the computer via the reader/perforator. A YES response to the display "DO YOU HAVE A PRESSURE TAPE?" will cause the LED display to lead you through the steps to load the tape in the tape reader. The tape reader loads the computer in about 5 seconds. Since there is no tape included with Flight #1, press the NO key. The LED will display "PERFORM BAROSWITCH CALIBRATION", then "ENTER PRESSURE AT CONTACT NO 1". The computer will direct you through the first of two alternate methods of entering the pressures from the pressure calibration chart. The first alternate method is known as the 15 CONTACT method and is programmed to operate automatically whenever the pressure calibration tape is missing or damaged. The LED displays (one at a time) 14 predetermined contacts. These contacts are 1, 5, 10, 15, 20, 25, 30, 40, 50, 60, 80, 100, 120 and 140. The 15th predetermined contact is the last contact on the pressure calibration chart having a printed pressure value, normally between 162 and 180 contacts.

a. Using the pressure calibration chart, enter the pressures as the LED display calls for them. The pressure for contact No 1 is 1061.2, enter the first 14 pressures now. The 15th predetermined contact in our case is 163. The LED will display "ENTER CONTACT NO OF LOWEST PRESS". Key in 163. The LED will display "ENTER PRESSURE AT CONTACT 163". Enter 3.2 millibars. The LED will display "BAROSWITCH PRESSURE DATA" and then the computer will print the pressures for all 15 contacts. After the pressures are printed the LED will display "ARE PRINTED PRESSURES CORRECT?". Recheck the printed data against the pressure calibration chart. A YES or NO response is required. If an error exists, press the NO key and the LED will display "ENTER PRESSURE AT CONTACT NO 1". Re-enter all 15 contacts. If the pressures are correct, press the YES key and, if the computer accepts the data, the next LED display will be "ENTER SFC PRESS (650.0 to 1100)".

41. If for some reason the computer will not accept the 15 contact method, the second of the two alternate methods must be used. The LED will display "PRESSURES CALIBRATION TAPE NEEDED". The next LED display is "IS REMEX OPERATIONAL?". A NO key entry will cause the LED to display "ENTER SERIAL NUMBER (XXX-XXXX)". The entry must be made as shown. After the radiosonde serial number (612-1565 for this flight, found in the upper left corner of the calibration chart) is keyed in, the LED will display "ENTER DETENT VALUE (.XX)". Key in the detent value (.55 for the radiosonde, found across from the serial number on the calibration chart). The LED will display "ARE PRINTED CHART VALUES OK?". A YES or NO response is needed. A NO entry will cause the computer to display "ENTER SERIAL NUMBER (XXX-XXXX)" again. A YES response will cause the LED to display "ENTER PRESSURE AT CONTACT 1". Enter the pressure at the first contact and each contact thereafter. Once enough pressures are entered for the sounding requirement, key in 00 and press the DATA IN key. The LED will display "ENTER SFC PRESS (650.0 to 1100)".

Key in the surface pressure to the nearest 0.1 millibar, (977.1 as shown on the radiosonde data sheet). The LED will display "ENTER CONTACT BELOW SFC PRESSURE". Our surface pressure is 977.1. This pressure falls between contacts 7 and 8, therefore the contact below surface pressure is 7. Key in 7 and the LED will display "ENTER PRESSURE AT CONTACT 7", then

key in 983.8 millibars. The LED will display "ENTER PRESSURE AT CONTACT 8". Key in 971.4. The LED displays "ARE PRINTED DATA OK?". Compare the printed data with the data you keyed in. A YES or NO response is required. A NO response will cause the computer to request all pressure data. A YES response causes the LED to display "PRESSURE CALIBRATION IS OK", then "PERFORM BASELINE CALIBRATION" then "ENTER BASELINE DRY BULB TEMP". The data for the baseline in the case of the J)31 Radiosonde is on the radiosonde data sheet under the title, Preflight Circuit Check. The dry bulb temperature is 30.0 C. Key in 30.0 and the LED will display "BASELINE CALIBRATION NEEDED?". The J031 is pre-basedlined so key in NO. The LED will display "ENTER BASELINE REFERENCE R.D.". The reference R.D. is always 95.0 so key in 95.0. The LED will then display "ENTER BASELINE TEMP RECORDER DIV". Key the recorder division for temperature shown on the radiosonde data sheet (in our case 73.42). The LED will display "ENTER BASELINE HUM RECORDER DIV". Key in the recorder division for humidity, (78.18). The LED will display "ENTER TEMP LOCK-IN RESISTANCE". Key in the five digit figure for ohms, (14042). The LED will display "ENTER HUM LOCK-IN RESISTANCE". Key in 10370. The computer will print all the calibration data and the LED will display "ARE PRINTED BASELINE VALUES OK?". A YES or NO response is necessary. A NO response will require all preflight circuit check data to be re-entered. Check the data carefully and, if correct, enter YES. The LED will display "BASELINE CALIBRATION COMPLETED" and then display "DO YOU WANT TAQ MET?". Key in NO. The LED will display "ENTER ZULU TIME (0000 to 2359)".

42. With this display we have completed the calibration portion of the sounding. The next entries will take us into the release data. The LED display "ENTER ZULU TIME (0000 to 2359)" is requesting the time Zulu (GMT) that the balloon was released. This time is found in the Launch Time GMT block of the radiosonde data sheet. Key in 1440. The entry of the launch time completes the preflight circuit check (baseline check) portion of the sounding.

43. The release data block will be used in the following entries. When the launch time is entered the LED displays "ENTER AZIMUTH OFFSET AT LAUNCH". The azimuth offset is the direction the balloon was from the GMD at release. Generally, the zero line of the control recorder tape will show this angle. Key in 300. The LED will display "ENTER HORIZONTAL DISTANCE OFFSET". This is the distance from the GMD to the release point in meters. Key in 50.0. The LED will display "ENTER SFC WIND DIRECTION (deg.)". Key in 300.1. In this case the wind direction and the horizontal direction to the release point are the same. In other cases, they may differ. The LED will display "ENTER SFC WIND SPEED". Key in the wind speed of 10 knots. The LED will display "ARE PRINTED SFC WIND VALUES OK?". Compare the data printed with the radiosonde data sheet. If the values are the same, a YES response is necessary. If not, a NO response is given and all SFC wind data is re-entered.

44. The LED will display "ENTER SURFACE PRESSURE AT LAUNCH". Our surface pressure is 977.1, the same as during the baseline portion. Key in 977.1. The LED will display "ENTER SFC CONTACT AT LAUNCH". If the pressure has not changed neither will the contact. Key in 7.5. The LED will display "IS LAUNCH SFC PRESS OK? 977.1". Respond with a YES or NO. If the response is NO the computer will return to "ENTER SURFACE PRESS AT LAUNCH" and all surface data must be re-entered. A YES response will cause the

LED to display "IS SFC CONTACT CORRECT? 7.5.". Again, a YES or NO response is required. A NO response will cause the LED to display "ENTER SFC CONTACT AT LAUNCH" and again, all surface data must be re-entered. At this point, the computer will compare the surface contact and the surface contact at launch. If a difference of more than 2.0 contacts exists, the computer will print "SFC PRESSURE DIDN'T CORRELATE WITH PRESSURE AT BASELINE; THEREFORE, THIS FLIGHT IS TERMINATED BUT IF EITHER A CONTACT OR PRESSURE ERROR IS FOUND THE FLIGHT MIGHT BE SALVAGED BY RE-ENTERING ALL DATA FOR THIS FLIGHT." Then the LED will display "PREPARE FOR NEXT FLIGHT." and then "ENTER YEAR (1900 to 1999). A YES response to LED display "IS LAUNCH SFC PRESS OK? 977.1" will cause the LED to display "ENTER SFC REFERENCE RD (tenths)". This data is found on the SUR or 0 line of the radiosonde data sheet. Key in 95.0 and the LED will display "ENTER SFC TEMPERATURE RD (tenths)". Key in 70.6. The LED displays "ENTER SFC HUMIDITY RD (tenths)". Key in 56.4. The LED then displays "ARE RD's FOR REF, TEMP & HUM OK?" A YES or NO response is required. A NO response causes the LED to display "ENTER SFC REFERENCE RD (tenths)" and all data after the reference has to be re-entered. A YES response causes the computer to print "AUTO PRESS CONT CORRECTION Ø.Ø". The computer would automatically correct each contact entered if there had been a contact correction on the surface level. In this case there was no contact correction. The LED will display "NEED USAF WMO MESSAGE?". We will produce air weather messages on all four soundings so key in YES. The LED displays "ENTER USAF (IIiii) LOCATION CODE". The USAF location code is a five digit number for each reporting location, in our case (Ft. Sill) the number is 72355. Once the location is entered the LED will display "IS PRINTED USAF CODE CORRECT?". A YES or NO response is required. A NO response will return to the LED display "NEED USAF WMO MESSAGE?". All data must be re-entered. A YES response will cause the computer to print "USAF Code: 72355" and the LED to display several items. "OK FOR MESSAGE HEIGHT TO 100 METERS.", "ENTER SIG LEVEL #1", and "ENTER PRESS CONTACT: 18.1".

45. The display "ENTER PRESS CONTACT 18.1" is actually the contact of the first mandatory level. The computer is waiting for the first significant level. Each level listed on the radiosonde data sheet is a significant level. Enter contact 9.3, the contact for level 1. The LED will display "ENTER TIME (0.01 to 150 minutes)". Level one time is 0.38, so enter this time. The LED displays "ENTER REFERENCE ORDINATE (Tenths)"; enter 95.0. The LED displays "ENTER TEMPERATURE RD (Tenths)"; enter 69.4. The LED displays "ENTER HUMIDITY RD (Tenths)": enter 42.6. Once the data for that significant level is entered, the computer will print the data and the LED will display "IS PRINTED DATA FOR SIG LEV OK?". Double check the data and enter YES or NO as required. A NO response will require the first level to be re-entered.

46. The YES response causes several LED display changes. The first display: "TEMP LAPSE RATE (DEGREES/KM)" indicates the direction or slope of the temperature trend between levels. The next display is "EVALUATE SIGNIFICANT LEVEL #2." Each significant level will be entered as the LED requests the data. The same procedures used for level 1 will be used until the program memory has stored sufficient time, pressure, temperature, and humidity data to satisfy either a complete sound ranging or artillery zone. When enough met data is stored, a winds data request is displayed: "ENTER ELEV ANGLE AT TIME XX.X". This remains displayed until the winds data

entry begins. For Flight #1, enough met data has been put into memory to satisfy the requirement for several sound ranging zones, and the LED displays "ENTER ELEV ANGLE AT TIME 0.4". Look at your control-recorder tape and obtain the elevation angle for 0.4 minutes (25.90) and key it into the computer. The LED then displays "ENTER AZ ANGLE AT TIME 0.4". Obtain the azimuth angle (347.15) and key it into the computer. The LED again requests the elevation and azimuth angle for the next higher tenth (.1) of a minute. Enter elevation and azimuth angles at time 0.5. The purpose of this is to enable the computer to interpolate between the two sets of angles to determine the exact angles at the top of the zone. Once all the data is entered, the LED will display "ARE PRINTED ANGLES FOR TIME OK?". Compare both the elevation and azimuth angles with the ones printed on the control-recorder tape, if correct, press the YES key; if not, press the NO key and re-enter the data as requested. Pressing the YES key puts the data into memory and causes the LED to display "OK FOR MESSAGES TO HEIGHT XXXXX" and then requests data for another significant level or the next zone's wind data. You will find that all the rest of the entries which you have to make will be repetitious and that you should have no problem understanding the LED's request for data. Enter the data for each level up to , and including, level #4.

47. Level #5 is the first mandatory level. The program will not permit you to omit or bypass a mandatory level, unless that particular level is within an area of missing data. If you try to enter 20.5 (level 6) instead of the mandatory contact 18.1 the LED will display "ENTER MANDATORY CONTACT" and then re-display "ENTER PRESS CONTACT: (18.1)". Enter the data for level #5.

48. There is a way to bypass a mandatory level or a significant level, if the level falls within an area of missing data. Look at level #6 on your radiosonde data sheet. Notice that there is no temperature or humidity data for this level. This is an example of a significant level within an area of missing data. You will also nótice an asterisk (*) to the right of the reference value. This is how you pass this significant level. Go ahead and key in the requested data for level #6, to include the asterisk (*) with the reference. When 95.0*
is entered, the LED displays "DOES MISSING DATA STOP HERE?". The answer to this request is NO. Upon pressing the NO key, the LED displays "IS MET DATA MISSING AT CONTACT?". The answer to this request is YES, since the met data is missing at this level. Pressing the YES key causes the printer to print "TEMP & HUMIDITY ARE MISSING AT THIS LEVEL", while the LED displays "EVALUATE SIGNIFICANT LEVEL #7" and "ENTER PRESS CONTACT (32.2)".

49. Evaluate Level #7, being sure to enter the asterisk (*) with the reference. When the LED displays DOES MISSING DATA STOP HERE? answer with the YES key, since you have met data for this level. Once the YES key is pressed, the printer prints "MET DATA RESUMES HAD BEEN MISSING", and the LED displays "ENTER TEMPERATURE RD (tenths)". Finish entering the rest of the met data for Level #7, and the angular data for 4.2 and 4.3 minutes only.

50. After the angular data for 4.2 and 4.3 minutes has been keyed in and verified, enter significant level #8. Suppose that some time after 5.2 minutes the control recorder ran out of paper or the paper advance

mechanism failed. It would be nearly impossible for you or any one else to stand by the control-recorder with pencil and paper copying the angular data every six seconds (10 prints per minute). All you have to do is change the PRINTS PER MINUTE switch on the control-recorder to 1 or 2 prints per minute and copy the angular data once or twice a minute. When this occurs, there has to be a way to let the computer know that you are going to enter angular data on the half or whole minute. This is done by using the asterick * again. Let's assume that the control-recorder ran out of paper and that the PRINTS PER MINUTE switch on the control-recorder has been placed in the one print per minute position. This can be done only after the radiosonde has ascended over 1000 meters. The LED is displaying "ENTER ELEV ANGLE AT TIME: 5.5". Instead of keying in the elevation angle at 5.5 minutes, key in 1.0*. This tells the computer of the change, and the LED displays "ENTER ELEV ANGLE AT TIME: 5.0". Enter the angular data for 5.0 minutes. After the angular data for 5.0 minutes is verified, the LED displays "ENTER ELEV ANGLE FOR TIME: 6.0". Now let's assume that a new roll of paper has been put in the control-recorder and that it is printing again at 10 prints per minute. Instead of entering the elevation angle for 6.0 minutes, key in .1* and the LED will display "ENTER ELEV ANGLE AT TIME: 5.5". If you had wanted to inform the computer that the control-recorder was printing at 2 prints per minute, you would have entered .5* instead of the 1.0*. Key in the necessary data to complete levels 8 and 9 when requested by the LED display.

51. Now that you have entered all the data for the 9 significant levels, and have assumed that the flight is complete, suppose the Q-5 operator informs you that he had made a mistake in Level #9? Correcting this error is a very simple process. When the LED displays "EVALUATE SIGNIFICANT LEVEL #10" and "ENTER PRESS CONTACT (32.2)", press the NO key. Pressing the NO key causes the LED to display "DELETE", "OUTPUT", "INFO" ACTIVE". What this means is that the DELETE, OUTPUT, AND INFO keys on the SPECIAL FUNCTION keyboard are active and can now be used. Press the DELETE key since you want to delete some bad met data. The DELETE key causes the LED to display, in sequence, "DELETING SIGNIFICANT LEVEL", "EVALUATE SIGNIFICANT LEVEL #9", and "ENTER PRESSURE CONTACT: (32.2)". At the same time, the printer prints "REPEATING LEVEL". By repeated use of the NO and DELETE key, you can delete all of the levels necessary in order to correct erroneous data. Enter level #'s 10 thru 16.

52. Since you have entered all the required data for Flight #1, I'm sure you would like to see the results of your work. At this time, press the NO key and when the LED displays "DELETE", "OUTPUT", "INFO" ACTIVE", press the OUTPUT key. The LED then displays "TURN ON REMEX". Reach over and turn on the remex (Reader/Perforator). The first message you will receive is the sound ranging message. So sit back and watch the fruits of your labor appear.

53. The "INFO" key, on the special function keyboard, will cause the computer to print out all data entered into or evaluated by the computer for each zone.

54. After all of the met messages are printed out, the LED displays "NEED "LAST FLIGHT" UPDATING?". Pressing the YES key causes the computer to dump the previous flight and place this flight into memory. Pressing the NO key causes the LED to display "PROCESSING FLIGHT CONTINUATION" and the computer automatically takes you back to "EVALUATE SIGNIFICANT LEVEL #17", "ENTER PRESS CONTACT (54.2)". The logic behind this is very simple. Suppose someone only wants a 5-line message. Instead of making him wait until the flight was completed, you could output the required messages by pressing the NO key and then the OUTPUT key when the LED displayed OK FOR MESSAGES TO HEIGHT 2000. If only the computer and ballistic type 3 messages were required, you could delete the other messages when the LED displayed that they were being processed by using the DELETE key. For all flights in this reference note, use the NO key.

55. You have completed flight #1 and have a hard copy of the messages. Now eject the tape and shut off the computer. Work the second and third flights for more practice. Use the linearity calibration chart, the pressure calibration chart and the angular data from flilght #1 for both of the remaining flights. To start the next flight insert the tape, turn on the computer, and begin.

56. For other capabilities of the OL-192 in the processing of met data, refer to TM 11-6660-263-10, Meteorological Data Groups OL-192/GMD-1 and OL-192A/GMD-1.

OCTANT 1

BALLISTIC DENSITY FROM SURFACE DATA

(FM 6-15)

STATION	LOCATION		RELEASE TIME	✓	DATE	HOUR	FLIGHT NO.
MET	34.7	98.3		LST	28 JUNE 87	0900	1
				GMT	28 JUNE 87	1500	

1 — (8) TYPE MESSAGE: BALLISTICS [X] A

(1) SURFACE PRESSURE: INCHES; MILLIBARS: 1004.3; MSL % STD (ICAO)

2 — (9) REGION: 1 [X] 2 3 4 5 6 7

SKY CLEAR

(2) DRY: 9.5 °C

(3) WET: 5.8 °C

3 — (10) PERIOD: NIGHT [ ] AFTERNOON [X] TRANSITION

TEMPERATURE

(4) DEPRESSION: °C

(11) TRUE SURFACE DENSITY

(5) VIRTUAL: °C %STD

(12) MEAN SURFACE DENSITY: 96.6

(6) STATION HEIGHT (10's meters): 036

4 — (13) DEPARTURE FROM MEAN SURFACE DENSITY

(7) SUNRISE: 0523 SUNSET: 1951

LINES	DEPARTURE FROM MEAN BALLISTIC DENSITY (14)	BALLISTIC DENSITY % (15)	COMPUTATIONS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

OBSERVER	COMPUTER	CHECKER

WIND COMPUTATION (ELECTRONIC OR VISUAL)

For use of this form, see FM 6-15; the proponent agency is the US Army Training and Doctrine Command.

STATION	LOCATION		RELEASE TIME		DATE	HOUR	FLIGHT NO.
MET	34.7	98.3		LST	28 Jun 1985	0900	
				GMT	28 Jun 1985	1500	1

ZONE NO.	TIME AT TOP OF ZONE (minutes & seconds) (1)		ZONE HEIGHT (meters)	PRESSURE AT TOP OF ZONE	TIME AT TOP OF ZONE	ELEVATION ANGLE (degrees & tenths)	AZIMUTH ANGLE (degrees & tenths)	HORIZONTAL DISTANCE (meters)	HORIZONTAL TRAVEL IN ZONE (meters)	TIME IN ZONE (minutes & tenths)	ZONE WIND DATA		BALLISTIC DATA	
	30 GRAM BALLOON	100 GRAM BALLOON	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	AZIMUTH (10 mils) (10)	SPEED (knots) (11)	AZIMUTH (100 mils) (12)	SPEED (knots) (13)
OFF SET			SUR				31.0	100			SUR 210	SUR 07	SUR	SUR
1	0:54	0:36	200		0.6	25.7	34.3							
2	2:24	1:24	500		1.4	29.4	29.2							
3	5:00	2:54	1000		2.9	34.7	21.4							
4	7:42	4:24	1500		4.4	39.2	17.3							
5	10:24	5:48	2000		5.8	47.3	11.8							
6	15:42	8:54	3000		8.9	47.3	08.4							
7	21:00	12:00	4000		12.0	44.9	02.3							
8	26:18	15:18	5000		15.3	39.5	358.3							
9	31:36	18:48	6000		18.8	33.1	351.6							
10	42:24	25:36	8000		25.6	29.8	348.9							
11	53:12	32:24	10000		32.4	26.7	344.6							
12	64:00	39:12	12000		39.2	24.4	342.8							
13		46:00												
14		52:48												
15		59:36												
16														

ELECTRONIC	MESSAGE TYPE (CHECK ONE) (14)			THEODOLITE OPERATOR	ZONE WIND PLOTTER	BALLISTIC WIND PLOTTER
	BALLISTIC		FALLOUT			
VISUAL	S	A	COMPUTER	TIMER RECORDER	ZONE WIND COMPUTER	TEAM CHIEF

DA FORM 4469
1 AUG 78

Edition of Dec 75 is obsolete

OCTANT 2

BALLISTIC DENSITY FROM SURFACE DATA

(FM 6-15)

STATION	LOCATION		RELEASE TIME		DATE	HOUR	FLIGHT NO.
MET	40.6	127.5		LST	9 NOV 1987	1015	2
				GMT	9 NOV 1987	0215	

1 (8) TYPE MESSAGE: BALLISTICS — S [X]

(1) SURFACE PRESSURE: INCHES —; MILLIBARS 987.4; MSL % STD *(ICAO)* —

2 (9) REGION: 1 [X] | 2 | 3 | 4 | 5 | 6 | 7

OVC
RAIN

TEMPERATURE

(2) DRY 5.3°C

(3) WET 4.8°C

(4) DEPRESSION °C

(5) VIRTUAL °C %STD

3 (10) PERIOD: NIGHT | AFTERNOON [X] | TRANSITION

(11) TRUE SURFACE DENSITY

(12) MEAN SURFACE DENSITY 95.6

(6) STATION HEIGHT *(10's meters)* 047

4 (13) DEPARTURE FROM MEAN SURFACE DENSITY

(7) SUNRISE 0701 SUNSET 1733

LINES	DEPARTURE FROM MEAN BALLISTIC DENSITY (14)	BALLISTIC DENSITY % (15)	COMPUTATIONS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

OBSERVER	COMPUTER	CHECKER

DA FORM 1 JUN 76 4524

Replaces DA Form 6-50, Mar 62, which will be used.

WIND COMPUTATION (ELECTRONIC OR VISUAL)

For use of this form, see FM 6-15: the proponent agency is the US Army Training and Doctrine Command.

STATION	LOCATION		RELEASE TIME		DATE	HOUR	FLIGHT NO.
MET	40.6	127.5		LST	9 Nov 1985	1015	2
				GMT	9 Nov 1985	0215	

ZONE NO.	TIME AT TOP OF ZONE (minutes & seconds) (1)		ZONE HEIGHT (meters)	PRESSURE AT TOP OF ZONE	TIME AT TOP OF ZONE	ELEVATION ANGLE (degrees & tenths)	AZIMUTH ANGLE (degrees & tenths)	HORIZONTAL DISTANCE (meters)	HORIZONTAL TRAVEL IN ZONE (meters)	TIME IN ZONE (minutes & tenths)	ZONE WIND DATA		BALLISTIC DATA	
	30 GRAM BALLOON	100 GRAM BALLOON									AZIMUTH (10 min)	SPEED (knots)	AZIMUTH (100 min)	SPEED (knots)
			(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
OFF-SET			SUR				310.0	50			SUR 130	SUR 08	SUR	SUR
1	0:54	0:36	200		0.6	29.3	322.8							
2	2:24	1:24	500		1.4	32.7	327.4							
3	5:00	2:54	1000		2.9	36.4	331.7							
4	7:42	4:24	1500		4.4	39.9	339.5							
5	10:24	5:48	2000		5.8	42.3	344.1							
6	15:42	8:54	3000		8.9	47.8	351.2							
7	21:00	12:00	4000		12.0	45.6	001.8							
8	26:18	15:18												
9	31:36	18:48												
10	42:24	25:36												
11	53:12	32:24												
12	64:00	39:12												
13		46:00												
14		52:48												
15		59:36												
16														

ELECTRONIC	MESSAGE TYPE (CHECK ONE) (14)			THEODOLITE OPERATOR	ZONE WIND PLOTTER	BALLISTIC WIND PLOTTER
	BALLISTIC		FALLOUT			
VISUAL	S	A	COMPUTER	TIMER RECORDER	ZONE WIND COMPUTER	TEAM CHIEF

DA FORM 4469
1 AUG 78

Edition of Dec 75 is obsolete

OCTANT 0

BALLISTIC DENSITY FROM SURFACE DATA

(FM 6-15)

STATION	LOCATION		RELEASE TIME		DATE	HOUR	FLIGHT NO
MET	40.0	97.5		LST	4 JUNE 1987	0530	3
				GMT	4 JUNE 1987	1130	

1 (8) TYPE MESSAGE: BALLISTICS [X] C A

(1) SURFACE PRESSURE: INCHES ; MILLIBARS 974.8 ; MSL % STD (ICAO)

2 (9) REGION: 1 [X] 2 3 4 5 6 7

SKY CLEAR

(2) DRY 10.7 °C

(3) WET 9.3 °C

3 (10) PERIOD: [X] NIGHT [ ] AFTERNOON [ ] TRANSITION

TEMPERATURE

(4) DEPRESSION °C

(11) TRUE SURFACE DENSITY

(5) VIRTUAL °C %STD

(12) MEAN SURFACE DENSITY 95.6

(6) STATION HEIGHT *(10's meters)* 047

4 (13) DEPARTURE FROM MEAN SURFACE DENSITY

(7) SUNRISE 0521 SUNSET 1943

LINES	DEPARTURE FROM MEAN BALLISTIC DENSITY (14)	BALLISTIC DENSITY % (15)	COMPUTATIONS
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

OBSERVER	COMPUTER	CHECKER

WIND COMPUTATION (ELECTRONIC OR VISUAL)

For use of this form, see FM 6-15; the proponent agency is the US Army Training and Doctrine Command.

STATION	LOCATION		RELEASE TIME		DATE	HOUR	FLIGHT NO.
MET	40.0	97.5		LST	9 JUN 87	0530	3
				GMT	9 JUN 87	1130	

ZONE NO.	TIME AT TOP OF ZONE (minutes & seconds) (1)		ZONE HEIGHT (meters)	PRESSURE AT TOP OF ZONE	TIME AT TOP OF ZONE	ELEVATION ANGLE (degrees & tenths)	AZIMUTH ANGLE (degrees & tenths)	HORIZONTAL DISTANCE (meters)	HORIZONTAL TRAVEL IN ZONE (meters)	TIME IN ZONE (minutes & tenths)	ZONE WIND DATA		BALLISTIC DATA	
	30 GRAM BALLOON	100 GRAM BALLOON	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	AZIMUTH (10 mils) (10)	SPEED (knots) (11)	AZIMUTH (100 mils) (12)	SPEED (knots) (13)
OFF SET			SUR				224.0	75			SUR 057	SUR 04	SUR	SUR
1	0:54	0:36	200		.6	43.8	219.7							
2	2:24	1:24	500		1.4	48.3	217.9							
3	5:00	2:54	1000		2.9	44.7	213.4							
4	7:42	4:24	1500		4.4	39.5	207.8							
5	10:24	5:48	2000		5.8	36.6	203.6							
6	15:42	8:54	3000		8.9	31.2	198.7							
7	21:00	12:00	4000		12.0	29.7	196.9							
8	26:18	15:18	5000		15.3	26.4	191.4							
9	31:36	18:48	6000		18.8	24.7	189.7							
10	42:24	25:36	8000		25.6	22.5	186.4							
11	53:12	32:24	10000		32.4	21.9	181.1							
12	64:00	39:12	12000		39.2	19.2	179.3							
13		46:00												
14		52:48												
15		59:36												
16														

ELECTRONIC	MESSAGE TYPE (CHECK ONE) (14)			THEODOLITE OPERATOR	ZONE WIND PLOTTER	BALLISTIC WIND PLOTTER
	BALLISTIC		FALLOUT			
VISUAL	S	A	COMPUTER	TIMER-RECORDER	ZONE WIND COMPUTER	TEAM CHIEF

DA FORM 4469
1 AUG 78

Edition of Dec 75 is obsolete.

RADIOSONDE DATA FOR OL-192

STATION	LOCATION	FLIGHT NO.
FAMCC	347 983	PE 1

PRE-FLIGHT TIME		DATE	HOUR	BAROSWITCH NO.	PRESSURE	CONTACT
	LST	17 MAY 1987	0820	612-1565	977.1	~~7.5~~
	GMT	17 MAY 1987	1420			

PRE-FLIGHT CIRCUIT CHECK						REF. R.D.	LAUNCH TIME GMT
TEMP	30.0 °C	73.42	R.D.	14042	OHMS	95.0	1440
HUM	33 %	78.18	R.D.	10370	OHMS		

HORIZONTAL OFF-SET		SURFACE WIND		SFC PRESSURE	SFC CONTACT	WMO CODE
AZIMUTH	300.1	DIRECTION	300.1	977.1	7.5	72355
DISTANCE	50.0	SPEED	10.0			

LEVEL NUMBER	CONTACT	TIME	REFERENCE R.D.	TEMP. R.D.	HUM. R.D.
SUR 0	7.5	0.00	95.0	70.6	56.4
1	9.3	0.38	95.0	69.4	42.6
2	10.0	0.60	95.0	69.3	51.0
3	12.4	1.38	95.0	69.8	69.9
4	16.0	2.61	95.1	68.7	63.9
5	18.1	3.46	95.1	67.0	58.0
6	20.5	4.20	95.0*	XXX	XXX
7	24.2	5.31	95.0*	67.0	19.5
8	26.2	~~6.10~~	95.0	65.2	9.8
9	26.9	6.10	95.0	64.2	30.0
10	27.4	6.40	95.1	63.7	78.9
11	29.0	6.95	95.1	64.0	81.1
12	32.2	7.99	95.1	62.9	81.0
13	34.3	8.69	95.1	62.3	81.1
14	43.0	11.30	95.1	57.1	80.0
15	45.3	11.97	95.2	55.2	80.3
16	50.0	13.37	95.2	53.2	79.8

RECORDER OPERATOR	COMPUTER OPERATOR	CHECKER

FS Form 230 (TEST)
(TAD) 1 Dec 84

SURVEY DATED: 17 1430Z May 87
OCTANT: 1
LATITUDE: 34.7 LONGITUDE: 98.3
ELEVATION: 360 Meters

RADIOSONDE DATA FOR OL-192

STATION	LOCATION	FLIGHT NO.
FAMCC	347 983	PE 2

PRE-FLIGHT TIME		DATE	HOUR	BAROSWITCH NO.	PRESSURE	CONTACT
	LST	17 May 1987	0910	612-1565	967.4	8
	GMT	17 May 1987	1510			

PRE-FLIGHT CIRCUIT CHECK						REF. R.D.	LAUNCH TIME GMT
TEMP	30.0 °C	73.72	R.D.	13787	OHMS	95.0	1520
HUM	33 %	78.33	R.D.	10251	OHMS		

HORIZONTAL OFF-SET		SURFACE WIND		SFC PRESSURE	SFC CONTACT	WMO CODE
AZIMUTH	300.1	DIRECTION	300.0	967.4	8.3	72355
DISTANCE	50.0	SPEED	10.0			

LEVEL NUMBER	CONTACT	TIME	REFERENCE R.D.	TEMP. R.D.	HUM. R.D.
SUR	8.3	0.00	95.0	73.4	79.4
1	10.0	0.49	95.0	72.2	78.0
2	16.0	2.65	95.0	69.4	70.8
3	18.1	3.34	95.0	68.3	67.4
4	19.0	3.70	95.0	68.0	75.9
5	20.0	3.93	95.0	68.7	75.3
6	21.4	4.23	95.0	70.0	82.1
7	22.0	4.42	95.0*	XXX	XXX
8	29.0	6.60	95.0*	68.2	82.5
9	32.2	7.60	95.0	66.7	82.4
10	40.0	10.01	95.0	61.5	81.1
11	46.0	11.80	95.0	57.1	81.0
12	50.0	12.97	95.0	54.5	81.8
13					
14					
15					
16					

RECORDER OPERATOR	COMPUTER OPERATOR	CHECKER

FS Form 230 (TEST)
(TAD) 1 Dec 84

SURVEY DATED: 11 1856Z May 87
OCTANT: 1
LATITUDE: 347 LONGITUDE: 98.3
ELEVATION: 360 Meters

RADIOSONDE DATA FOR OL-192

STATION	LOCATION	FLIGHT NO.
FAMCC	347 983	PE 3

PRE-FLIGHT TIME		DATE	HOUR	BAROSWITCH NO.	PRESSURE	CONTACT
	LST	17 May 1987	0800	612-1565	966.2	8.4
	GMT	17 May 1987	1400			

PRE-FLIGHT CIRCUIT CHECK						REF. R.D.	LAUNCH TIME GMT
TEMP	30.0 °C	73.72	R.D.	13787	OHMS	95.0	1415
HUM	33 %	78.33	R.D.	10251	OHMS		

HORIZONTAL OFF-SET		SURFACE WIND		SFC PRESSURE	SFC CONTACT	WMO CODE
AZIMUTH	300.1	DIRECTION	300.0	966.2	8.4	72355
DISTANCE	50.0	SPEED	10.0			

LEVEL NUMBER	CONTACT	TIME	REFERENCE R.D.	TEMP. R.D.	HUM. R.D.
SUR 0	8.4	0.00	95.0	74.2	81.4
1	13.0	1.27	94.8	72.0	80.7
2	18.1	2.53	94.7	69.5	79.8
3	22.0	3.79	94.7	68.0	78.9
4	24.0	4.37	94.7	68.7	79.9
5	32.2	6.83	94.5	65.2	81.6
6	38.0	8.64	94.5	61.7	80.8
7	45.0	11.10	94.3*	XXX	XXX
8	54.1	13.68	94.2*	52.5	81.1
9	64.0	16.66	94.1	45.5	75.4
10	67.3	17.99	94.1	41.7	76.3
11	74.4	19.71	94.1	37.2	75.0
12	82.5	22.23	94.1	28.6	XXX
13	91.4	25.10	94.0	22.5	XXX
14	95.0	26.28	94.0	19.9	XXX
15	98.0	27.29	94.0	18.7	XXX
16					

RECORDER OPERATOR	COMPUTER OPERATOR	CHECKER

FS Form 230 (TEST)
(TAD) 1 Dec 84

SURVEY DATED: 17 1430 May 87
OCTANT: 1
LATITUDE: 34.7 LONGITUDE: 98.3
ELEVATION: 360 Meters

ANGULAR DATA FOR PRACTICAL EXERCISES

EL	TIME	AZ
30.97	8.3	038.24
30.87	8.2	037.92
30.71	8.1	037.40
30.46	7.4	034.48
30.88	7.3	033.88
30.54	7.2	033.41
30.52	7.1	032.32
30.39	7.0	032.40
30.38	6.9	031.89
30.37	6.8	031.51
30.51	6.2	028.25
30.63	6.1	027.77
30.41	6.0	025.66
30.19	5.6	024.83
30.21	5.5	024.16
30.13	5.4	023.43
30.08	5.0	022.15
30.04	4.9	020.02
30.02	4.8	019.19
-		
29.79	4.3	015.97
29.84	4.2	016.33
29.81	4.1	014.79
30.04	3.6	012.49
30.04	3.5	011.91
30.80	3.0	009.41
31.14	2.9	008.97
31.27	2.8	008.21
31.27	2.7	007.55
31.42	2.4	005.80
31.29	2.3	005.35
31.27	2.2	005.15
31.13	2.1	004.62
30.85	2.0	004.16
30.04	1.9	003.73
29.34	1.8	003.39
29.08	1.7	002.67
28.21	1.6	001.73
27.67	1.5	001.22
27.68	1.4	000.17
26.62	1.3	359.47
26.04	1.2	358.17
25.23	1.1	357.13
24.81	1.0	355.02
24.02	0.9	353.36
26.71	0.6	351.58
26.39	0.5	349.94
25.90	0.4	347.15
02.20	0.0	300.05

EL	TIME	AZ
37.65	26.5	093.12
XXX	26.4	XXX
37.53	26.3	092.80
37.47	24.2	087.53
37.41	24.1	087.58
36.95	24.0	085.81
36.71	21.8	081.76
36.71	21.7	081.49
35.89	19.6	074.18
35.86	19.5	073.78
XXX	19.4	XXX
35.72	19.3	072.97
35.63	19.2	072.57
34.33	17.6	067.52
34.25	17.5	067.23
34.16	17.4	066.97
31.43	15.0	061.95
31.30	14.9	061.72
30.70	13.4	057.95
30.69	13.3	057.65
31.46	12.5	055.72
31.52	12.4	055.39
31.55	12.3	055.07
31.64	12.2	054.64
31.63	12.1	054.25
31.66	12.0	053.28
31.73	11.9	053.33
31.33	11.8	053.00
31.75	11.2	050.13
31.57	11.1	049.60
31.61	11.0	049.11
31.78	10.9	048.75
32.25	10.8	048.39
31.62	10.7	048.05
31.78	10.6	047.71
31.53	10.0	045.11
31.32	9.9	044.94
31.58	9.8	044.58
31.48	9.7	044.17
31.64	9.6	043.76
31 39	9.5	043.38
31.54	9.4	042.94
31.61	9.3	042.50
30.89	8.7	039.90
30.88	8.6	039.39
30.94	8.5	038.97
30.88	8.4	038.78

(ELECTRONIC) OFF SET ~~AZ~~ AZ ANGLE
ZS FEED AT OPS CONTROL
TIME RECORDER

BAROSWITCH PRESSURE CALIBRATION CHART

DATE 17 MAY 84 RELEASE TIME, G.M.T. 1400 SOUNDING NO. PE2-2-3

STATION FAMCG COMPUTED NO. DETENT CLICKS 10

BAROSWITCH SERIAL NO. 612 - 1565 * DETENT CLICK VALUE .55

INCREASE ↑

	1	2	3	4	5	6	7	8	9
LOOK AT	1061.2	1047.6	1035.0	1022.0	1009.0	996.6	983.8	971.4	958.8
10	DECREASE	12	13	14	15	16	17	18	19
946.6	934.8	922.6	910.8	899.0	887.4	876.0	864.4	852.8	841.4
20	21	22	23	24	25	26	27	28	29
830.2	819.4	808.2	796.0	785.0	774.2	763.6	752.8	742.4	731.8
30	31	32	33	34	35	36	37	38	39
722.0	711.0	701.6	691.2	681.4	671.2	661.8	652.4	642.4	633.2
40	41	42	43	44	45	46	47	48	49
623.8	614.2	605.4	596.2	587.0	578.2	569.0	560.4	551.8	543.0
50	51	52	53	54	55	56	57	58	59
534.6	526.4	517.8	509.8	501.4	493.4	485.2	477.2	469.4	461.6
60	61	62	63	64	65	66	67	68	69
453.8	446.4	438.8	431.2	423.8	416.6	409.8	402.6	395.6	388.6
70	71	72	73	74	75	76	77	78	79
381.8	374.8	368.0	361.2	354.8	348.2	341.6	335.2	328.6	322.2
80	81	82	83	84	85	86	87	88	89
316.4	310.0	304.0	298.0	291.6	286.2	280.4	274.6	269.0	263.6
90	91	92	93	94	95	96	97	98	99
258.0	252.6	247.0	241.6	236.6	231.2	226.2	220.8	216.2	211.0
100	101	102	103	104	105	106	107	108	109
206.2	201.0	196.6	191.6	187.0	182.2	178.0	173.6	169.0	164.6
110	111	112	113	114	115	116	117	118	119
160.2	156.2	151.8	147.6	143.8	139.8	135.8	131.8	128.0	124.2
120	121	122	123	124	125	126	127	128	129
120.4	116.8	113.2	109.8	106.2	102.8	99.2	96.0	92.8	89.8
130	131	132	133	134	135	136	137	138	139
86.6	83.4	80.2	77.4	74.4	71.4	68.4	65.8	62.8	60.0
140	141	142	143	144	145	146	147	148	149
57.4	54.4	52.0	49.6	46.8	44.4	42.0	39.4	37.0	34.8
150	151	152	153	154	155	156	157	158	159
32.6	30.2	28.0	25.6	23.4	21.0	18.8	16.6	14.4	12.2
160	161	162	163	164	165	166	167	168	169
10.0	7.6	5.4	3.2	.0	.0	.0	.0	.0	.0
170	171	172	173	174	175	176	177	178	179
.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CONTACT VALUES FOR MANDATORY LEVELS

CONTACTS		CONTACTS		CONTACT		CONTACT	
1000 MB	5.72	300 MB	82.66	70 MB	135.46	7 MB	161.27
850 MB	18.24	250 MB	91.46	50 MB	142.83	5 MB	162.18
700 MB	32.15	200 MB	101.22	30 MB	151.09	3 MB	163.09
500 MB	54.17	150 MB	112.42	20 MB	155.45	2 MB	163.54
400 MB	67.37	100 MB	125.77	10 MB	160.00	1 MB	164.00

VIZ MANUFACTURING CO.
335 E. PRICE ST. PHILA. PA. 19144 215-844-2626

VIZ FORM NO. 1292-168
7/81 — 175M

0000 0000 0000 0001 21106 09042

Recorder Chart TMQ-5

Recorder Ch

RECORDER S/N:
000003
CALIBRATION ON:
22 1250Z FEB 85

INPUT Hz	TRUE RD	ACTUAL RD	ERROR RD
190	95	95.0	0.0
180	90	90.0	0.0
160	80	80.0	0.0
140	70	70.0	0.0
120	60	60.0	0.0
100	50	49.9	0.1
80	40	39.9	0.1
60	30	30.0	0.0
40	20	19.9	0.1
20	10	9.9	0.1
10	05	4.7	0.3
00	00	0.0	0.0